6. (Amended) An apparatus as in claim 1 further including a support that mounts the opposed bending platens at upper and lower locations with respect to each other

The bending and tempering apparatus includes a support that mounts the opposed bending platens at upper and lower locations with respect to each other
Col. 3, ll. 9-12; Col. 5, ll. 23-25.

wherein the first platen is the lower platen and the second platen is the upper platen,

Figures 5-8

at least one template being mounted above said upper platen,

a template 24, seen in Figures 5-8, is located on the other side of second platen 22 away from glass sheet 12.
Col. 5, ll. 3-5.

the lower [bending] platen being deformable and having a connection to the actuator so as to deform the lower platen from the planar shape to the bent shape, the upper platen being initially conformingly deformable to the shape of the lower platen as the heated glass sheet is moved with the lower platen and bent therebetween said platens, both of said platens subsequently conforming to the shape of said template as said lower platen is moved toward said template and the glass sheet is bent to its final bent shape, and both of said platens including quench openings that move therewith during the deformation of the platens and subsequently supply quenching gas to temper the bent glass sheet.

The lower platen 22 is deformable and has a connection to actuator 16 so as to deform the lower platen from the planar shape to the bent shape. The upper platen 22 is initially conformingly deformable to the shape of the lower platen 14 as the heated glass sheet 12 is moved with the lower platen and bent between the platens. Both of the platens 14,22 subsequently conform to the shape of template 24 as the lower platen 14 is moved toward the template and the glass sheet is bent to its final bent shape. Both of the platens 14,22 include quench openings 18 that move with the platens during the deformation of the platens and subsequently supply quenching gas to temper the bent glass sheet.
Col. 5, ll. 26-38.

7. (Amended) An apparatus as in claim 1 wherein the first [lower] platen includes deformable drive shafts, drive wheels mounted on the drive shafts to engage the heated glass sheet and provide movement thereof during platen deformation that provides the bending, and quench tubes that define the quench openings of the first [lower] platen and rotatably support the drive shafts thereof such that the drive wheels move the heated

the lower platen 14 includes deformable drive shafts 28 and drive wheels 30 mounted on the drive shafts to engage the heated glass sheet 12 and provide movement of the glass sheet during platen deformation that provides the bending. Quench tubes 32 define the quench openings 18 of lower platen 14 and rotatably support drive shafts 28 such that the drive wheels 30 move the heated glass sheet 12 during the bending and quenching.

glass sheet during the bending and tempering [quenching].

Col. 5, ll. 39-47.

8. (Amended) An apparatus as in claim 7 wherein the second [upper] platen includes idler shafts, idler wheels mounted on the idler shafts to engage the heated glass sheet and to rotate with movement of the glass sheet, and quench tubes that define the quench openings of the second [upper] platen and rotatably support the idler shafts.

the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. As with the lower platen 14, quench tubes 32 define the quench openings 18 of the upper platen 22 and rotatably support the idler shafts 38.
Col. 5, ll. 54-60.

9. (Amended) An apparatus as in claim 8 wherein the second [upper] platen further includes an actuator for raising said upper platen to allow the glass sheet to be indexed therebetween said platens, said actuator allowing said second [upper] platen to be maintained in its deformed shape against [said] a template after the bending of the glass sheet and furthermore for controllably returning said second [upper] platen to a planar shape.

upper platen 22 further includes an actuator 42 also illustrated as a plurality of piston and cylinder arrangements 43 of the fluid actuable type for raising the upper platen to allow the glass sheet 12 to be indexed between the platens 14,22. Actuator 42 also allows upper platen 22 to be maintained in its deformed shape against template 24 after the bending of the glass sheet 12 and furthermore allows for controllably returning the upper platen to a planar shape after the bent glass sheet has been indexed out of apparatus 10.
Col. 5, l. 61 to Col. 6, l. 63.

11. (Amended) An apparatus as in claim 7 further including means for reversibly driving the drive wheels to move the glass sheet during the bending and tempering [quenching].

A control 34 and reversible drive electric motors 36 drive drive wheels 30 to index the glass sheet 12 into the glass bending and tempering apparatus, oscillate the glass sheet during the bending and tempering
Col. 5, ll. 47-51.

15. (Amended) A glass bending and tempering apparatus comprising:	a glass bending and tempering apparatus ***Col. 4, ll. 30-31.***
a first platen for receiving a heated glass sheet to be bent; said first platen being deformable and including an actuator for deforming said platen from a planar shape to a bent shape;	a first platen 14 for receiving the heated glass sheet 12 to be bent. The first platen 14 is deformable and includes an actuator 16 for deforming the platen from a planar shape to a bent shape ***Col. 4, ll. 46-49.***
said first platen including quench openings throughout the extent thereof; said quench openings of the first platen movable therewith during the deformation of the platen;	The first platen includes quench openings 18 throughout a surface 20 of the platen best seen in FIG. 2. The quench openings 18 are movable with the platen 14 during deformation of the platen ***Col. 4, ll. 57-60.***
a second platen having quench openings throughout the extent thereof and opposing the first platen with the glass sheet therebetween;	A second platen 22 also has quench openings 18 throughout a surface 20' of the platen, best seen in FIG. 3. The second platen 22 opposes the first platen 14 with the glass sheet 12 therebetween. ***Col. 4, ll. 61-65.***
a support mounting said platens at upper and lower locations with respect to each other wherein the first platen is the lower platen and the second platen is the upper platen;	The bending and tempering apparatus includes a support that mounts the opposed bending platens at upper and lower locations with respect to each other ***Col. 3, ll. 9-12; Col. 5, ll. 23-25.***
said actuator being constrainable and having the ability to lift portions of said first platen a controlled distance to form the desired bent shape in the glass sheet;	The actuator is constrainable and has the ability to lift portions of the first platen a controlled distance to form the desired bent shape in the glass sheet. ***Col. 4, ll. 65-68.***
said lower platen including deformable drive shafts, drive wheels mounted on the drive shafts to engage the heated glass sheet and provide movement thereof during	the lower platen 14 includes deformable drive shafts 28 and drive wheels 30 mounted on the drive shafts to engage the heated glass sheet 12 and provide

platen deformation that provides the bending, and quench tubes that define the quench openings of the lower platen and rotatably support the drive shafts thereof such that the drive wheels move the heated glass sheet during the bending and tempering [quenching];	movement of the glass sheet during platen deformation that provides the bending. Quench tubes 32 define the quench openings 18 of lower platen 14 and rotatably support drive shafts 28 such that the drive wheels 30 move the heated glass sheet 12 during the bending and quenching. ***Col. 5, ll. 39-47.***
said upper platen including idler shafts, idler wheels mounted on the idler shafts to engage the heated glass sheet and to rotate with movement of the glass sheet, and quench tubes that define the quench openings of the upper platen and rotatably support the idler shafts;	the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. As with the lower platen 14, quench tubes 32 define the quench openings 18 of the upper platen 22 and rotatably support the idler shafts 38. ***Col. 5, ll. 54-60.***
and quenching gas being supplied to the quench openings of both platens and thereby to both sides of the glass sheet to temper the bent glass sheet between the platens.	Quenching gas is supplied to the quench openings of both platens 14,22 and thereby to both sides of glass sheet 12 to temper the bent glass sheet between the platens.
16. (Amended) A glass bending and tempering apparatus comprising:	a glass bending and tempering apparatus ***Col. 4, ll. 30-31.***
a first platen for receiving a heated glass sheet to be bent; said first platen being deformable and including an actuator for deforming said platen from a planar shape to a bent shape;	a first platen 14 for receiving the heated glass sheet 12 to be bent. The first platen 14 is deformable and includes an actuator 16 for deforming the platen from a planar shape to a bent shape ***Col. 4, ll. 46-49.***
said first platen including quench openings throughout the extent thereof; said quench openings of the first platen movable therewith during the deformation of the platen;	The first platen includes quench openings 18 throughout a surface 20 of the platen best seen in FIG. 2. The quench openings 18 are movable with the platen 14 during deformation of the platen ***Col. 4, ll. 57-60.***

a second platen having quench openings throughout the extent thereof and opposing the first platen with the glass sheet therebetween;	A second platen 22 also has quench openings 18 throughout a surface 20' of the platen, best seen in FIG. 3. The second platen 22 opposes the first platen 14 with the glass sheet 12 therebetween. ***Col. 4, ll. 61-65.***
a support mounting said platens at upper and lower locations with respect to each other wherein the first platen is the lower platen and the second platen is the upper platen;	The bending and tempering apparatus includes a support that mounts the opposed bending platens at upper and lower locations with respect to each other ***Col. 3, ll. 9-12; Col. 5, ll. 23-25.***
said second platen including an actuator for raising and lowering said second platen with respect to said first platen;	upper platen 22 further includes an actuator 42 also illustrated as a plurality of piston and cylinder arrangements 43 of the fluid actuable type for raising the upper platen to allow the glass sheet 12 to be indexed between the platens 14,22. Actuator 42 also allows upper platen 22 to be maintained in its deformed shape against template 24 after the bending of the glass sheet 12 and furthermore allows for controllably returning the upper platen to a planar shape after the bent glass sheet has been indexed out of apparatus 10. ***Col. 5, l. 61 to Col. 6, l. 3.***
at least one template mounted above said upper platen; said second platen being pressed against said template as the first platen is deformed from a planar shape to a bent shape to bend the heated glass sheet thereagainst said second platen; said second platen conforming to said template;	The lower platen 22 is deformable and has a connection to actuator 16 so as to deform the lower platen from the planar shape to the bent shape. The upper platen 22 is initially conformingly deformable to the shape of the lower platen 14 as the heated glass sheet 12 is moved with the lower platen and bent between the platens. Both of the platens 14,22 subsequently conform to the shape of template 24 as the lower platen 14 is moved toward the template and the glass sheet is bent to its final bent shape. ***Col. 5, ll. 26-35.***

said lower platen including deformable drive shafts, drive wheels mounted on the drive shafts to engage the heated glass sheet and provide movement thereof during platen deformation that provides the bending, and quench tubes that define the quench openings of the lower platen and rotatably support the drive shafts thereof such that the drive wheels move the heated glass sheet during the bending and tempering [quenching];	the lower platen 14 includes deformable drive shafts 28 and drive wheels 30 mounted on the drive shafts to engage the heated glass sheet 12 and provide movement of the glass sheet during platen deformation that provides the bending. Quench tubes 32 define the quench openings 18 of lower platen 14 and rotatably support drive shafts 28 such that the drive wheels 30 move the heated glass sheet 12 during the bending and quenching. ***Col. 5, ll. 39-47.***
said upper platen including idler shafts, idler wheels mounted on the idler shafts to engage the heated glass sheet and to rotate with movement of the glass sheet, and quench tubes that define the quench openings of the upper platen and rotatably support the idler shafts;	the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. As with the lower platen 14, quench tubes 32 define the quench openings 18 of the upper platen 22 and rotatably support the idler shafts 38. ***Col. 5, ll. 54-60.***
and quenching gas being supplied to the quench openings of both platens and thereby to both sides of the glass sheet to temper the bent glass sheet between the platens.	Quenching gas is supplied to the quench openings of both platens 14,22 and thereby to both sides of glass sheet 12 to temper the bent glass sheet between the platens. ***Col. 5, ll. 10-13.***

27. (New) An apparatus for uniformly tempering a glass sheet comprising:	a glass bending and tempering apparatus ***Col. 4, ll. 30-31.***
opposing upper and lower longitudinally extending, spaced apart quench tubes;	Quench tubes define the quench openings of the lower platen ***Col. 3, ll. 32-33.***
	quench tubes define the quench openings of the upper platen ***Col. 3, ll. 38-39.*** Figures 2 and 3
an actuator connected to the quench tubes for moving the quench tubes as a glass sheet is bent about a direction parallel to the quench tubes to generally conform the tubes to the shape of the bent glass sheet;	The lower platen 22 is deformable and has a connection to actuator 16 so as to deform the lower platen from the planar shape to the bent shape. The upper platen 22 is initially conformingly deformable to the shape of the lower platen ***Col. 5, ll. 26-30.***
means connected to the movable quench tubes for movably engaging the glass sheet;	the lower platen 14 includes deformable drive shafts 28 and drive wheels 30 mounted on the drive shafts to engage the heated glass sheet 12 and provide movement of the glass sheet during platen deformation that provides the bending. ***Col. 5, ll. 39-43.***
	the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. ***Col. 5, ll. 54-57.***
and means to supply quenching gas through the quench tubes to uniformly temper a glass sheet therebetween.	Quenching gas is supplied to the quench openings of both platens 14,22 and thereby to both sides of glass sheet 12 to temper the bent glass sheet between the platens. ***Col. 5, ll. 10-13.***

30. (New) A glass sheet bending and tempering apparatus comprising:	a glass bending and tempering apparatus ***Col. 4, ll. 30-31.***
lower and upper opposed deformable platens	The bending and tempering apparatus includes a support that mounts the opposed bending platens at upper and lower locations with respect to each other ***Col. 3, ll. 9-12; Col. 5, ll. 23-25.***
each of which includes elongated quench tubes which are substantially parallel to each other and have quench openings;	Quench tubes define the quench openings of the lower platen ***Col. 3, ll. 32-33.***
	quench tubes define the quench openings of the upper platen ***Col. 3, ll. 38-39.*** Figures 2 and 3
the lower platen having deformable drive shafts which extend between the elongated quench tubes thereof and are oriented to be substantially perpendicular to those quench tubes and which are rotatably supported by those quench tubes, and the lower platen also having drive wheels supported on the deformable drive shafts thereof at spaced locations to engage and move the glass sheet to be bent;	the lower platen 14 includes deformable drive shafts 28 and drive wheels 30 mounted on the drive shafts to engage the heated glass sheet 12 and provide movement of the glass sheet during platen deformation that provides the bending. Quench tubes 32 define the quench openings 18 of lower platen 14 and rotatably support drive shafts 28 such that the drive wheels 30 move the heated glass sheet 12 during the bending and quenching. ***Col. 5, ll. 39-47.***
the upper platen having idler shafts mounted on the elongated quench tubes thereof and also having idler wheels mounted by the idler shafts at spaced locations to engage the glass sheet to be bent;	the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. As with the lower platen 14, quench tubes 32 define the quench openings 18 of the upper platen 22 and rotatably support the idler shafts 38. ***Col. 5, ll. 54-60.***
actuating means for causing deformation of the lower platen with the upper platen being conformably deformable to the shape of the lower platen as the lower platen is bent about a direction parallel to the	The lower platen 22 is deformable and has a connection to actuator 16 so as to deform the lower platen from the planar shape to the bent shape. The upper platen 22 is initially conformingly deformable to the

quench tubes from a flat shape to a bent shape with the glass sheet disposed between the platens as the quench openings of the elongated quench tubes and	shape of the lower platen 14 as the heated glass sheet 12 is moved with the lower platen and bent between the platens. Both of the platens 14,22 subsequently conform to the shape of template 24 as the lower platen 14 is moved toward the template and the glass sheet is bent to its final bent shape. Both of the platens 14,22 include quench openings 18 that move with the platens during the deformation of the platens and subsequently supply quenching gas to temper the bent glass sheet. ***Col. 5, ll. 26-38.***
the wheels are moved with the platens as the wheels engage and bend the glass sheet;	the upper platen 22 includes idler shafts 38 and idler wheels 40 mounted on the idler shafts to engage the heated glass sheet 12 and to rotate with movement of the glass sheet. As with the lower platen 14, quench tubes 32 define the quench openings 18 of the upper platen 22 and rotatably support the idler shafts 38. ***Col. 5, ll. 54-60.***
means to supply quenching gas to the quench openings of both platens after bending has finished to thereby temper the bent glass sheet between the platens;	Quenching gas is supplied to the quench openings of both platens 14,22 and thereby to both sides of glass sheet 12 to temper the bent glass sheet between the platens. ***Col. 5, ll. 10-13.***
and drive means for reversibly driving the drive wheels to move the glass sheets during the bending and tempering of the glass sheet.	A control 34 and reversible drive electric motors 36 drive drive wheels 30 to index the glass sheet 12 into the glass bending and tempering apparatus, oscillate the glass sheet during the bending and tempering ***Col. 5, ll. 47-51.***

Support for the above amendments is also provided by the figures, particularly Figures 1, 2 and 3, as well as throughout the description.

Claims 27-29 were rejected under 36 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), as the time the

application was filed, had possession of the claimed invention. In particular, claim 27 was rejected under this section for the reason that the claim "has no support for moving or changing the position of a surface of the quench tubes so as to conform to the glass sheet which is intended to be tempered...as claim 27 is written there is no indication that the movement of the quench tubes is while the glass sheet is being bent and the glass sheet is between the upper and lower quench tubes during this movement as is provided for in the specification as filed, there is no enablement for a stand alone tempering apparatus which moves to conform to the shape of a bent glass sheet."

Applicants traverse the rejection of claim 27. As previously noted it is clear from the drawings and specification that applicants invented an improved quench as well as a combined bending and quenching apparatus. Applicants specifically recognized the problem of efficiently quenching bent glass:

> ...once the glass sheet arrives at the quenching station, the quenching air typically is applied in a nonuniform manner with respect to the bend in the bent glass sheet causing unbalanced rates of cooling over the surface of the glass sheet.
> ***Col. 1, ll. 52-56.***

Applicants further noted that one object of their invention related specifically to tempering:

> Another object of the invention is to provide an apparatus that has movable quench openings that move with the surfaces of the flat glass sheet to provide equal thermal conditions during tempering in a more uniformly tempered glass sheet.
> ***Col. 2, ll. 38-42.***

The Abstract also recognizes the quenching apparatus as an independent feature of the invention:

> Quenching gas is supplied by both platens (14,22) through quench openings (18) that move with the platen (14,22) to temper the bent glass sheet between the platens.

Thus, though the illustrated embodiments show bending and quenching at a single location, it is clear that applicants contemplated novel and unobvious improvements to both a bending apparatus and a quenching apparatus.

Finally, Applicants again note that the improved quench was clearly contemplated as their invention, as evidenced by the original title, "Bent Glass Sheet Quench," given application Serial No. 07/083,675 (the application for the '527 patent that is the subject of this reissue application) when it was filed on August 7, 1987. For these reasons, as well as for the reasons cited in the parent applications to this reissue application, Applicants respectfully request reconsideration and allowance of claim 27.

The rejection of claims 28-29 is moot because they have been canceled.

Claims 6-16, 28 and 29 were rejected under 35 U.S.C. § 112 second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which application regards as the invention. Applicant has amended claims 6-9, 11, 15 and 16, including adding language which provides antecedent basis for the "upper platen" and the "lower platen", as well as substituting "tempering" for "quenching", in response to the specific objections under this section. As amended, these claims are believed to satisfy the requisites of 35 U.S.C. § 112, second paragraph.

Claim 1 was rejected under 35 U.S.C. § 102(b) as being anticipated by Bocelli et al. 4,540,425 (Bocelli '425). Bocelli discloses an apparatus for bending and tempering glass sheets which includes a series of horizontal rows which can be adjusted, offline, to conform to a template of desired curvature to bend glass sheets about a radius of curvature that is

transverse to the direction of conveyance of the glass sheets. Bocelli neither discloses nor suggests a glass bending and tempering apparatus including first and second deformable platens and including an actuator for lifting portions of the first platen a controlled distance to *form the desired bent shape in the glass sheet*. (Emphasis added), as specified in claim 1. It is clear from the disclosure of Bocelli et al. that the Bocelli apparatus does not utilize a pair of platens wherein the lower platen is actuatable to form the glass sheet:

> Since the apparatus is mounted on rails, such adjustments may be performed off the production line.
> ***Col. 6, ll. 12, 13.***
>
> Rollers 13 and counterrollers 15 are driven in rotation by chains and standard drive means (not shown in the drawings). Glass plates V arrive on rollers 6 of the conveyor from furnace 5, engage rollers 13 and counterrollers 15, and while moving along on rollers 13 gradually take on the curved profile on which the said rollers are placed.
> ***Col. 6, ll. 18-24.***
>
> If it is desired to change templates 8 and 9 to make glass sheets of a different curvature, rotation of rollers 13 and counterrollers and the blowing of novels 17 and 18 are interrupted and jack 59 is activated.
> ***Col. 6, ll. 30-33.***

Thus, it is clear from the disclosure of the '425 patent that the Bocelli device provides an apparatus for bending a glass sheet about an axis perpendicular to the direction of movement of the glass sheet, and once conformed to a desired template offline, the rollers are not moved by an actuator to form the glass sheet as it is moved on the rollers. For these reasons, applicant respectfully requests reconsideration and allowance of claim 1.

New claim 30 is also believed to patentably distinguish over the cited art for the above cited reasons, since it contains all of the limitation of claim 1, as well as the upper and lower platen locations, elongated quench tubes, lower deformable drive shafts and drive

wheels, upper idler shafts and idler wheels, and actuating means for causing deformation of the lower platen with the upper platen being conformably deformable to the shape of the lower platen as the lower platen is bent about a direction parallel to the quench tubes from a flat shape to a bent shape with the glass sheet disposed between the platens. This specific structure is neither disclosed nor suggested by the cited art. In addition, new claim 30 discloses means to supply quenching gas to the quench openings of both platens after bending is finished to thereby temper the bent glass sheet between the platens, and drive means for reversibly driving the drive wheels to move the glass sheets during the bending and tempering of the glass sheet. Again, there is no disclosure nor suggestion of this claim structure in the cited art. For these reasons, allowance of new claim 30 is respectfully requested.

The reissue oath/declaration filed with the application was rejected as defective because it failed to provide a statement regarding amendments of 1-5-98 and 11-9-98 that every error being corrected by those amendments arose without deceptive intension on the part of the applicant. Claims 1-16 and 27-29 were rejected as being based upon a defective reissue oath/declaration under 35 U.S.C. 251 as set forth above. A seventh substitute reissue declaration is being submitted herewith, including, at paragraph 10, the language identified as acceptable to overcome this rejection. As such, reconsideration and withdrawal of this rejection is respectfully requested.

In light of the foregoing, as well as for the reasons set forth in applicants prior amendments in this and the parent reissue cases, re-issuance of claims 1-16, reconsideration and allowance of claim 27, and consideration and allowance of new claim 30 is requested.

The Examiner is urged to contact the undersigned attorney by telephone to discuss any matters pertaining to this reissue application if he believes it will be useful in expediting this application.

A check in the amount of $190.00 is enclosed to cover the Petition fee. Please charge any additional fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978 -- a duplicate of this paper is enclosed for that purpose.

Respectfully submitted,

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By 

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